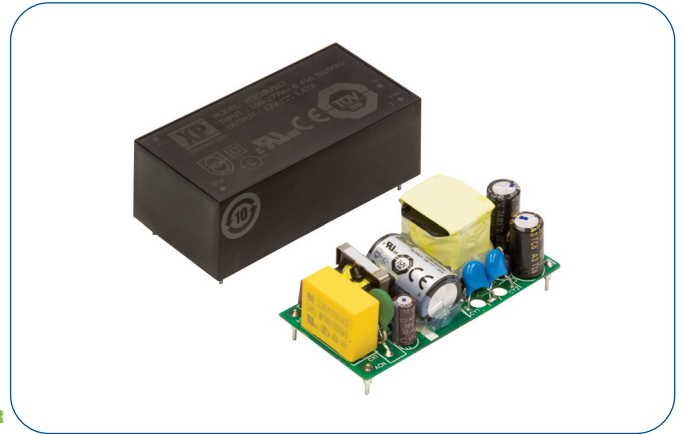


### 20 Watts

- 85 to 305VAC Input
- Single Outputs from 3.3 to 48VDC
- PCB Mount
- Encapsulated & Open Frame
- ITE & Household Appliance Approvals
- EN55035 Immunity Standard
- Class II
- Low Cost
- 3 Year Warranty



#### Dimensions:

##### VCE20:

2.60 x 1.30 x 0.92" (66.0 x 33.0 x 23.4 mm)

##### VCE20-P:

2.50 x 1.20 x 0.86" (63.5 x 30.5 x 21.8 mm)

The VCE20 is a series of open frame and encapsulated AC-DC single output power supplies designed for low cost ITE, industrial and domestic applications. The series provides two mechanical options including open frame and encapsulated PCB mount. With approvals to world-wide safety standards including ITE and Household, compliance with class B for conducted and radiated emissions, these class II isolation parts benefit system designers with easy integration into a wide range of applications.

### Models & Ratings

Output Power	Output Voltage	Output Current	Model Number
15 W	3.3VDC	4.55 A	VCE20US03
20 W	5.0VDC	4.00 A	VCE20US05
20 W	9.0VDC	2.22 A	VCE20US09 <sup>(1)</sup>
20 W	12.0VDC	1.67 A	VCE20US12 <sup>(1)</sup>
20 W	15.0VDC	1.33 A	VCE20US15 <sup>(1)</sup>
20 W	24.0VDC	0.83 A	VCE20US24 <sup>(1)</sup>
20 W	48.0VDC	0.42 A	VCE20US48 <sup>(1)</sup>

### Notes

1. For Open Frame version add suffix -P to model number, e.g. VCE20US12-P.

### Summary

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage Range	85		305	VAC	Derate output from 100% at 90 VAC to 90% at 85 VAC
No Load Input Power			0.3	W	
Efficiency		85		%	Model dependant
Operating Temperature	-25		+70	°C	3V3 & 5V models: derate output linearly from 100% at +45 °C to 45% at +70 °C. Other models: derate output linearly from 100% at 50 °C to 50% at 70 °C.
EMC	EN55032 Level B Conducted & Radiated, EN601000-3-2, EN61000-3-3, EN55024				
Safety Approvals	IEC62368-1, IEC60335-1, IEC60950-1, EN62368-1, EN60335-1, UL62368-1				

### Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage Range	85		305	VAC	Derate from 100% at 90 VAC to 90% at 85 VAC
Input Frequency	47		63	Hz	
Input Current - Full Load		0.35/0.22		A rms	At 115/230 VAC
No Load Input Power			0.3	W	
Inrush Current			40	A	At 230 VAC, cold start 25 °C
Earth Leakage Current					Class II construction no earth
Input Protection	Internal T1.0 A/300 VAC fuse fitted in line				

### Output

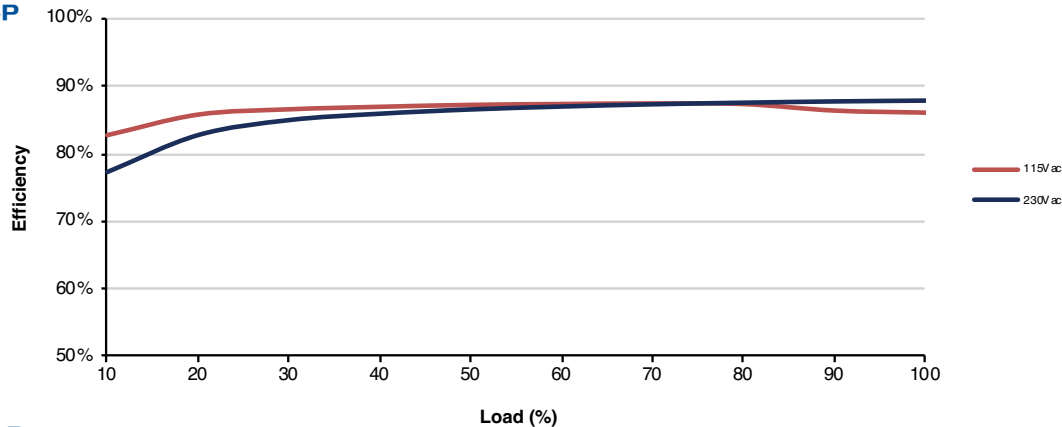
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage	3.3		48	VDC	
Initial Set Accuracy			1.5/1.0	%	1.5% for 3V3 & 5V models, 1% for others at 50% load
Minimum Load	0			A	No minimum load required
Line Regulation			1	%	
Load Regulation			1		
Start Up Delay			2	s	
Start Up Rise Time			35	ms	
Hold Up Time	8	14		ms	at full load and 115 VAC
Transient Response			4	%	Deviation, recovery within 1% in less than 500 $\mu$ s for a 25% load change
Ripple & Noise			100	mV pk-pk	3V3 & 5V models, 20 MHz bandwidth
			1	% pk-pk	9 to 48V models, 20 MHz bandwidth
Overvoltage Protection	115		140	% Vnom	210% typical for 3V3 model, auto recovery
Overload Protection	110		190	%	
Short Circuit Protection					Trip & Restart (hiccup mode)
Temperature Coefficient			0.05	%/°C	

### General

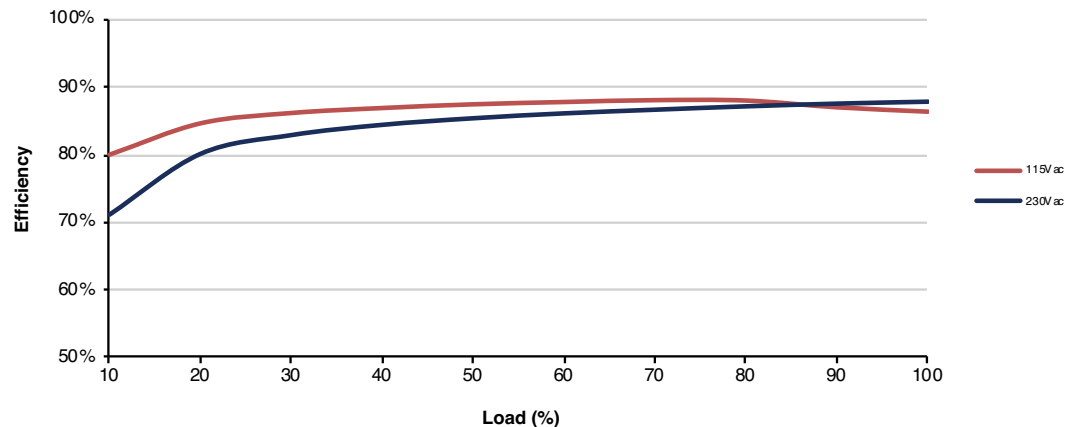
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		85		%	Model Dependant
Isolation: Input to Output	3000			VAC	
Switching Frequency	5		65	kHz	Variable
Power Density			7.7	W/in <sup>3</sup>	For '-P' version
Mean Time Between Failure	550	600		kHrs	MIL-HDBK-217F, +25 °C GB
Weight		0.088 (40)		lb (g)	Open frame versions (-P)
		0.198 (90)		lb (g)	Encapsulated version

### Efficiency Graphs

VCE20US12-P



VCE20US24-P



### Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-25		+70	°C	3V3 & 5V models: derate output linearly from 100% at +45 °C to 45% at +70 °C. Other models: derate output linearly from 100% at 50 °C to 50% at 70 °C.
Storage Temperature	-40		+85	°C	
Cooling					Convection-cooled
Humidity			95	%RH	Non-condensing
Operating Altitude			5000	m	
Shock	IEC68-2-27, 30 g, 11 ms half sine, 3 times in each of 6 axes				
Vibration	IEC68-2-6, 2 g, 10 Hz to 500 kHz, 10 mins/cycle, 60 mins each cycle				

### EMC: Emissions

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Conducted	EN55032	Class B		If output is connected to a ground additional external components will be required. Contact sales for details
Radiated	EN55032	Class B		
Harmonic Current	EN61000-3-2			Class A
Voltage Flicker	EN61000-3-3			

### EMC: Immunity

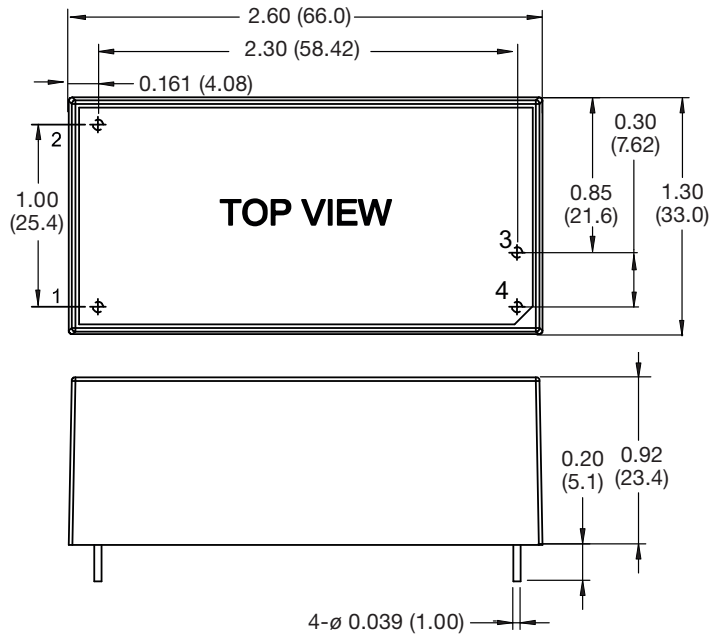
Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
ITE	EN55024 EN55035	As Below	As Below	
ESD	EN61000-4-2	±6kV contact, ±8kV air discharge	A	
Radiated	EN61000-4-3	10 V/m	A	
EFT	EN61000-4-4	3	A	
Surge	EN61000-4-5	2	A	Line to Line
Conducted	EN61000-4-6	10 Vrms	A	
Magnetic Fields	EN61000-4-8	30 A/m	A	
Dips and Interruptions	EN61000-4-11 (115 VAC)	70% U <sub>r</sub> (80.5 VAC) for 100 ms	A	
		40% U <sub>r</sub> (46 VAC) for 200 ms	B	
		<5% U <sub>r</sub> (0 VAC) for 10 ms	A	
		<5% U <sub>r</sub> (0 VAC) for 5000 ms	B	
	EN61000-4-11 (230 VAC)	70% U <sub>r</sub> (161 VAC) for 100 ms	A	
		40% U <sub>r</sub> (92 VAC) for 200 ms	A	
		<5% U <sub>r</sub> (0 VAC) for 10 ms	A	
		<5% U <sub>r</sub> (0 VAC) for 5000 ms	B	

### Safety Approvals

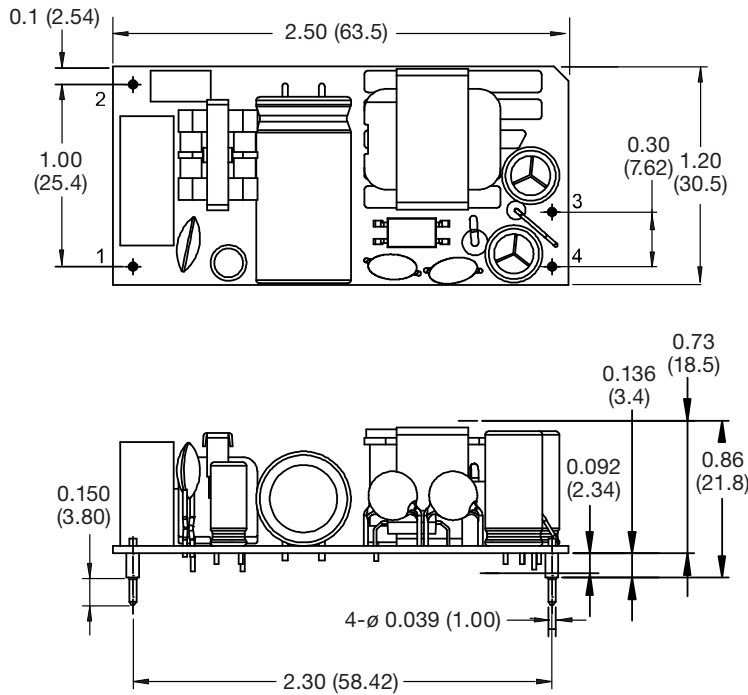
Safety Agency	Safety Standard	Notes & Conditions
CB	IEC60950-1	ITE
	IEC62368-1	
IEC	IEC60335-1	Household, informative only
UL	UL62368-1	ITE
TUV	EN62368-1	ITE
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

### Mechanical Details

#### Encapsulated



#### Open Frame (-P)



Pin Connections	
Pin	Single
1	ACN
2	ACL
3	-Vout
4	+Vout

#### Notes

1. Dimensions in inches (mm).

2. Weight: Open frame versions (-P): 0.088 lbs (40 g)  
Encapsulated: 0.198 lbs (90 g)

3. Tolerances: x.xx =  $\pm 0.02$  (x.x =  $\pm 0.5$ )  
x.xxx =  $\pm 0.01$  (x.xx =  $\pm 0.25$ )

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